



# Are You 'Stressing Out' Your Horse?

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## What is Stress?

Stress is the body's response to anything it considers threatening. For a horse this could be anything, including trailering and traveling, showing, poor nutrition, feeding at irregular times, changes in other routines, environmental toxins, interactions within their social environment, variations in climate, and illness.

Some types of stress include various physical stresses that are based on the physical makeup of the animal and its ability to respond to changes in diet, injury, etc. Psychological stresses are based on a horse's personality and its perception of life. For example, some horses are more stressed than others by being in a stall for long periods of time.

## How do Horses Cope with Stress?

The horse's basic stress response starts with a change in behavior, either by moving away from a stimulus, swishing its tail, bucking, tensing up, etc. This stress will then cause activation of the sympathetic nervous system, called the "Fight or Flight" response. The sympathetic nervous system will create an involuntary action of the intestines (diarrhea), endocrine glands (production of adrenaline and cortisol), and heart (increase in heart rate). Next the neuroendocrine system will be activated, allowing the horse's system to increase its energy utilization.

Each horse deals with stress in a different way depending on their personality.

### *Demonstrative, Confident Horse*

- Lets you know when it is stressed!
- Bucks, kicks, bites, is very curious, mouthy, a troublemaker, etc.

### *Demonstrative, Fearful Horse*

- Worries about everything!
- Shies the first time it sees things and needs time to relax.

### *Passive, Confident Horse*

- Usually wonders, "What's everyone worried about?"
- Not normally stressed, internalizes stress, shows little change even when stressed.
- Usually is the last one in the field to take off running if something runs out of the woods.

### *Passive, Fearful Horse*

- Wants to please!
- Seems willing to do anything, but will tighten muscles and lips when stressed.
- Won't show fear until pushed over the limit.

## **Heat Stress**

During exercise heat production will increase up to 50 %. This can create a problem when exercising under extremely hot and humid conditions. In response to heat stress the horse will increase its sweating rate, move a large portion of blood flow to capillaries under the skin, and increase its rate of respiration (may be over 20 breaths per minute in a resting horse) to help in the cooling process. Some horses will have a condition called "anhidrosis", which is when the horse lacks the ability to sweat. This makes their coat feel very hot yet dry. The horse's number one means of cooling down is through evaporation. When it does not sweat it is not able to use this method of cooling and the risk of overheating is even greater! Another way horses will show heat stress is with an increase in resting heart rate. At rest a normal range of heartbeats per minute should be between 28 and 36, however, when heat stressed it can be over 50. Internal rectal temperature will also be elevated to 104°F or higher.

When treating heat stress, the first thing you will need to do is move your horse to a shady area. Provide fans, wind, or other forms of ventilation, which will help with the evaporation process. Spraying the horse with cold water, specifically the legs and abdomen, will also help in this process because the veins and arteries lie just below the skin and can rapidly cool blood flowing to internal organs. Allow the horse to drink small amounts of water frequently and provide electrolytes to replace those lost by excessive sweating. In severe cases you should contact a veterinarian immediately. Cold-water enemas will probably be administered and the horse will be treated for dehydration.

Once a horse overheats it is much more likely to overheat again, so preventing heat stress before it is ever a problem is extremely important. One way to help prevent heat stress is to provide regular electrolytes in hot weather, especially if training hard where the horse may lose a large quantity of water through perspiration. Increasing the amount of fat in the diet will allow you to decrease the amount of grain you need to feed, while keeping the energy density of the feed high. Always cool horses down properly after exercise, allowing plenty of time and ventilation. Avoid riding in extreme heat and humidity if at all possible.

## **Cold Stress**

Horses fight cold weather by using energy to stay warm. As a general rule, a 1% increase in energy requirement is needed to replace energy loss from cold weather for each degree the temperature falls below the horse's critical temperature. Critical temperature is the temperature below which a horse starts to expend additional energy to provide warmth. This temperature for individual horses will vary because of fat cover, hair thickness, and acclimatization of the horse to cold, hair coat wetness, and wind chill. For example, horses

clipped during the winter months will have a much higher critical temperature and will have to be blanketed to help thermoregulation. You can tell if a horse is losing too much heat if snow melts on its back instead of accumulating on top of its hair; shivering can also be an indication.

To help horses decrease their critical temperature, one needs to precondition them for cold weather. Making sure horses carry enough weight to use as energy and insulation is a good way to go into winter. Provide free choice grass hay during the winter months, which will allow the horses to always produce enough internal heat through gastrointestinal fermentation. Providing shelter from wind, rain, and cold is important. If you have a horse that is not allowed in the shelter with other horses it is a good idea to provide a blanket, especially when there is freezing rain. Be sure blankets are waterproof. A wet blanket may cause a horse to lose more heat than it would if it were not blanketed.

## **Transport Stress**

Below are some reasons why transporting can be stressful to your horse:

- *Physical factors*

- unnatural sense of confinement - withholding food and/or water
- noise and vibration of a moving vehicle - balancing and bouncing during the ride - poor ventilation
- presence of exhaust, dust, molds, manure, and urine

- *Psychological factors* - separation from the herd

- exposure to strange animals and environment

- *Climatic factors*

- high internal temperature and humidity

- *Health factors* - dehydration

- fatigue from constant balancing

*Shipping Fever* is a respiratory disease that develops during or shortly after a trip. A primary factor in shipping fever is suppression of the immune system due to the stress of the trip. Other than shipping fever, transportation stress can cause dehydration due to reduced fluid intake, loss of appetite, hypocalcaemia (low Calcium) or hypomagnesaemia (low Magnesium), weight loss, dust inhalation and coughing, diarrhea, and also possibly tying-up.

Studies in the past decade have investigated numerous factors during transport to try and make a horse's haul more comfortable. Some of these factors include orientation of the horse in the trailer during transport, design of the suspension and ventilation of the trailer, quality of the transport environment and air quality, and generally the amount of stress a horse is under during various lengths of hauls. Most studies have shown that levels of the stress hormone cortisol to increase during transportation, along with greater fluctuations in heart rate (known as heart rate variability). Some studies have reported as much as a 6% weight loss during a 24-hour haul. Half of this weight was replaced over a 24-hour recovery period. Muscle enzymes called creatine kinase and aspartate aminotransferase (CK & AST) leak out of the muscle after a 24-hour haul. This is a potential indicator for muscle damage.

To decrease transportation stress it is recommended to keep your total travel time under 12 hours. If this is not possible, plan overnight stops where you can unload your horse and allow it to rest. It is also recommended to stop every 3 to 4 hours to offer the horse's legs a break from the vibration, and provide water every 6 to 8 hours of the trip. Cleaning the trailer thoroughly after each use will decrease the amount of dust inhaled. It is also a good idea to leave your horse's head untied or loosely tied to allow them to lower their heads if they need to cough. Always leave a trailer window or vent open to allow for better ventilation. Horses are much more tolerant of the cold than they are of dust. It is always a good idea to give a horse a few days to recover after arriving at the destination. If you are concerned about shipping fever you can monitor daily rectal temperatures, which will help you detect a problem before it gets serious. On long hauls especially, it is a good idea to provide things that are comfortable to the horse, such as their usual hay, water, grain, or bedding.

Are dietary adjustments necessary before hauling a horse? Many people use bran mashes before transporting horses, however, there is no benefit in doing this. Bran mashes are what nutritionists call a "comfort food". They make owners feel like they did the right thing for their horse, yet they are not proven to have any real nutritional benefit. Before long hauls, especially during competition, it is a good idea to put your horse on a vitamin E supplement (1000 to 2500 IU/day) to help them cope with the stress. Also, giving them vitamin C (7 to 10 grams) the day of and 2 to 3 days after transport can help reduce the risk of shipping fever. It is a very good idea to vaccinate your horses against respiratory disease at least 2 weeks before traveling. Remember to never ship a sick horse long distances. Also, allow plenty of time for your trip in case of emergencies—this will also decrease stress in the life of the person doing the transporting!

## **Oxidative Stress**

During the metabolism of oxygen, about 98% of the oxygen consumed forms water and carbon dioxide, however, about 1 to 2% of the oxygen is not completely reduced and instead forms reactive oxygen species (ROS—intermediate molecules formed during metabolism of oxygen). These ROS produce harmful effects and can degrade proteins, DNA, and fatty acids that make up equine cells. Some of these ROS include hydrogen peroxide ( $\text{H}_2\text{O}_2$ ), singlet oxygen ( $^1\text{O}_2$ ), and free radicals (an ROS with an unpaired electron).

Antioxidants are the body's way of combating the negative effects of the ROS. Some common antioxidants include: vitamin E, vitamin C, beta-carotene, glutathione, lipoic acid, selenium, cysteine, glutathione peroxidase, etc. Oxidative stress occurs when the body's antioxidants are overwhelmed by production of ROS. Antioxidant supplementation may be needed during times of stress that have been associated with an increase in oxidative stress. These include: intense and endurance exercise, rapid growth, reproduction, transportation, illness, or other types of stressful situations described above. When supplementing antioxidants, mixtures usually work best. It is important to avoid over-supplementation due to the fact that some of the antioxidant vitamins and minerals can be toxic to the system in extremely high doses.

## **Stomach Ulcers**

Are you giving your horse an ulcer? Did you know that 80–90% of all racehorses have ulcers? Also, 60% of all performance horses (including eventers, jumpers, and western performance events), and 30–40% of all dressage horses develop ulcers.

A horse's stomach secretes acid even when they are not eating, unlike in humans. However, only ½ of their stomach is protected against damage from the acid. When a horse grazes all day the roughage helps absorb the acid and the saliva produced neutralizes acid. Ingestion of a grain meal increases 'gastrin', a hormone that stimulates acid secretion. Therefore, it is important to always feed forage along with a grain meal. The main causes of stomach ulcers are changes in eating behavior, changes in management, or an increase in training intensity. Horses that are accustomed to being outside can develop ulcers after only 1 week of being kept in a stall, while others could develop them within 24 hours.

Some signs that a horse is developing ulcers include a change in attitude, poor appetite, colic, decreased performance, decrease in body condition, weight loss, and a dull or sour attitude. To prevent ulcers, you need to prevent stress and minimize the use of non-steroidal anti-inflammatory agents (NSAID) such as, phenylbutazone (Bute).

### **Exertional Rhabdomyolysis (ER)**

Other terms for ER are tying-up, azoturia, or Monday morning sickness. This condition is muscle pain and cramping associated with exercise. Its main prevalence is in the middle gluteal or semitendinosus muscles of the hindquarters. There are sporadic or chronic forms of ER, which could be severe enough to decrease performance or end a career. There are different causes of tying-up for different breeds, however, recurrent ER (RER) primarily affects Thoroughbreds, Standardbreds, and Arabians. Nervous two-year-old fillies are most severely affected due to the stress associated with their training regime. With these horses the incidence may increase in severity as fitness increases.

One way to test for ER is to take a blood sample after exercise and have the sample analyzed for CK and AST (muscle enzymes described above). These enzymes will be drastically elevated during a bout of ER and may even be elevated at rest in a horse that chronically ties up. The clinical signs that your horse is tying-up include: stiffness of gait in the hind legs, unwillingness to move, and sensitivity of touch to the affected muscles. These muscles will feel very tight or tense. In severe cases the horse's urine will be a brown or reddish color from the breakdown and excretion of the myoglobin in the muscle.

To treat a horse afflicted with ER, immediately move it to a box stall and call a veterinarian. Blanket the horse if weather is cool or hose the horse to remove sweat if weather is warm. Check for signs of dehydration using the skin pinch test and look at mucous membranes. Allow small frequent sips of water when the horse is hot, and free access to water when the horse is cool. Many other factors can contribute to tying-up. However, to help decrease the incidence of the disease attempts should be made to decrease training-induced stress. Dietary changes and vitamin E supplementation may also help in some cases.

### **Summary of How to Minimize Stress in Your Horse's Life:**

- Keep horses turned out as much as possible but if not possible, feed *ad libitum* hay.
- Stick to a routine but if you need to make changes, do so slowly.
- When traveling take items that are familiar (e.g. your own hay, water, grain, etc.).
- Avoid riding in extreme weather conditions.
- Feed a well balanced diet.
- Maintain a good health program.
- Provide a pleasant environment.

- Provide regular varied exercise.
- Allow for play time.
- Prevent boredom.
- Allow your horse social activity.
- Keep *yourself* happy, healthy, and stress free!!

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